



Original communication

Causes of unnatural deaths among children and adolescents in northern India – A qualitative analysis of postmortem data

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ABSTRACT

Aim of the study was to ascertain the various causes of unnatural deaths among 1–19 years analysing the postmortem data in a regional referral centre of northern India. A retrospective observational study from the data base was done for the same. All unnatural deaths in children aged 1–19 years from April 2010 to March 2011 were identified from the postmortem database. The children were classified into 3 groups- 1–5 years, 6–10 years and 11–19 years separately for males and females. The various modes of unnatural deaths were identified and analysed. Retrospective analysis of Postmortem data during one year revealed total of 434 unnatural deaths in children aged 1–19 years. The most vulnerable age group included children between 11–19 years (74.5%). Females (51.6%) marginally outnumbered the males (48.4%). Flame Burns (58.3%) was the commonest cause of death in all age followed by road traffic accidents 15%, electrocution 7.8% & Poisoning accounted for 6%. The most frequent victims were adolescents (74%) almost 3 times that of other age group.

This study showed Adolescents were the most common victims of the unnatural death with flame burn being the most common cause followed by RTA, electrocution and poisoning.

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1. Introduction

In developing countries all health initiatives are focused on common childhood problems like diarrhoea, ARI, malnutrition and others which are the major killers.¹ However there is a significant percentage of morbidity and mortality in children due to unnatural causes particularly the adolescents.² Unnatural deaths are deaths due to murder, suicide, traffic accident, industrial accident or other accidents like drowning, falling down, snake bite, sun stroke etc. In this study we try to find out the causes of unnatural deaths from post-mortem data analysis of unnatural deaths in children between 1 and 19 years in our hospital, which a referral centres for Northern India.

2. Methods

The data of all unnatural deaths in children aged 1–19 years from April 2010 March 2011 were identified from the postmortem database of our hospital. The deaths were classified into 3 groups; deaths in 1–5 years, 6–10 years and 11–19 years separately for

males and females. The various modes of unnatural deaths implicated were broadly divided into 11 groups namely Burns, poisoning, fall, RTA, hanging, Electric burn, chemical burn, scald burn, train accident, murder and drowning. Thus, age and sex wise information on causes of unnatural deaths in children was made. These data were analysed to ascertain the major causes of unnatural deaths in the region for the adolescents and children.

3. Observation

Retrospective analysis of postmortem data of one year revealed a total of 434 unnatural deaths in children aged 1–19 years out of which males were 210 (48.39%) and females were 224 (51.61%) [Table 1]. The most vulnerable age group included children between 11 and 19 years (74.5%) followed by 6–10 years (14.5%) & 1–5 years (11%). Females (51.61%) marginally outnumbered the males (48.4%) except in 6–10 years group. Among the deaths, accidental deaths were found to be most important cause comprising 356 (82%) cases followed by suicide 48 (11%), unknown cause 21 (4.83%) and homicide 9 (2.17%).

Flame Burns was the commonest cause 253 (58.3%) of death in all ages. However, it was significantly more in females (63.63%) than males (36.36%). Maximum deaths due to burn were seen in the

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Table 1
Age and sex wise distribution of patients.

Age	Male	Female	Total deaths
1–5 yrs	17	31	48
6–10 yrs	36	28	63
>11 yrs	157	165	323
	210	224	434

older than 11 year age group which constituted 80.63% of total burn cases. Next were the road traffic accidents (RTA), which accounted for 65 (15%) deaths and here males (67.69%) outnumbered females (32.3%). As in burns, the deaths in RTA were maximum in more than 11 years age group (60% of total RTA). Head injuries alone were the cause of fatalities in the majority of road traffic incidents. However in 1–5 years age group, death due to fall from height 10 (2.3%) was more common than RTA 8 (1.84%). Electrocution and Poisoning accounted for 34 (7.83%) and 26 (6%) deaths respectively. In both of these categories deaths were more in more than 11 years group (67.64% of electrocution and 92.3% of poisoning). Overall, the deaths were observed to be almost 3 times (74.2%) in adolescents in comparison to the rest. All cases of hanging and most cases poisoning (92.3%) were found in adolescents. All the cases hanging, train accidents and adolescent poisoning were suicidal. Out of the flame burns, 13 (1 male and 12 female) cases were due to suicide and all of them were in the adolescent age group. We had only 2 cases of drowning and both were in 1–5 years age group [Fig. 1].

4. Discussion

All national and international health programmes for children are mostly dedicated to reduce the underfive mortality as it contributes 40% of death globally. In this age group the causes of deaths are mostly perinatal or infections. But the cause of deaths in above five years children and the adolescents are quite different. So it is important to analyse the causes of such unnatural deaths to plan out preventive strategies appropriate for the region. The accidental death rate in India is 326 per 1 million people and that of our city is 436. Out of all the unnatural deaths, 5.7% are in the less than 14 years of age and the deaths due to unnatural causes is 14.4% of all the deaths in this age.

As all unnatural deaths are to undergo postmortem, so a retrospective analysis of postmortem data was planned. Our hospital is in a megacity comprising of more than fourteen million people. In our study we had a total of 434 unnatural deaths during one year duration in age group between 1 and 19 years. Flame burn was found to be the commonest cause followed by road traffic accident,

electrocution and poisoning. Adolescents were the group mostly succumbed to the unintentional injuries. Road traffic accidents and poisonings are the other predominant causes of deaths as in other studies.^{2,3}

In contrast to our study, Kanchan T et al. in found road traffic accidents accounted for the majority of the deaths (38.4%), followed by burns (24.9%) and poisoning (15.9%).⁴ Male-to-female ratio was 1.5:1. Males predominantly died of traffic injuries (45.2%), whereas females as a result of burns (37.4%). The leading cause of mortality among youth in the United States is unintentional injuries (48%) with motor vehicle injuries accounting for the majority of these deaths (73%) followed by poisoning (7%) and drowning (5%). Among these deaths, homicide was 13% and suicide 11%.² The exceptionally high incidence death due to burn is most probably due to the fact that our hospital being the referral centre for burns injury both for treatment and postmortem.

RTA is found to be the most important cause of adolescent death in most of the studies globally.^{2–5} The increased pace of mechanization, increasing number of fast moving vehicles, unskilled or semiskilled drivers, drunken driving, ignorance and intentional violation of traffic rules and the woefully inadequate road system have this manmade epidemic in India. Almost all causes are preventable and a little effort at all levels like home, school and society can give a safe and stress free environment for the children to grow. Hyder A A et al. in their meta-analysis for south Asia region found that 22% of all the RTA occurred in children and adolescents and an average of 13% of all RTI deaths with an incidence rate of 17 deaths per 100,000 urban persons aged 0–19 in South Asia.⁶ RTA is not only responsible for significant number of mortality but contributes in a major way to the morbidity both physically and psychologically.⁷

Organophosphates and kerosene were major killers in the poisoning in our study. Gupta S K. Gupta et al. in a retrospective study found house hold substances (47.07%) to be the most common cause of poisoning followed by drugs (21.8%), agricultural pesticides (9.14%) and industrial chemicals (7.93%) with case fatality rate to be ranging from 2.9% to 4.7%.⁸ In our study, all the deaths due to poisoning in the adolescents and all the cases of hanging were suicidal. All the deaths due to poisoning in the adolescents were by agricultural pesticides. Kiran N et al. in a review shows 21% of all poisoning occurs in 1–20 years of age.⁵ Suicidal attempts among teenagers could be attributed to various factors like socio-economic, substance abuse, alcohol, abnormal sexual behaviour and psychiatric problems being the major contributors.⁹ In India, suicide is the cause of about twice as many deaths as is HIV/AIDS and about the same number as maternal causes of death in young women.¹⁰ However, unlike these two other causes of death, suicide attracts little public health attention. Most Indians do not have community or support services for the prevention of suicide and have restricted access to care for mental illnesses associated with suicide, especially access to treatment for depression, which has been shown to reduce suicidal behaviours.¹¹ In the medium term, the most feasible strategy would be to reduce access to organophosphate pesticides along with public education to improve acceptance of restrictions to access.¹² However, Urgent research is needed to explore the reasons for suicide in young people and the large regional variations seen in this study. These efforts should be paired with the implementation of comprehensive and evidence-based suicide prevention strategies.^{9,13} Otherwise in view of the steady decreases in maternal mortality, suicide will probably become the leading cause of death in young women in India in the next few years.¹⁴

In our study we found 23 falls which was 5.29% of the total deaths and was mostly found in 1 to 5 year age group. In most countries, falls are the most common type of childhood injury seen

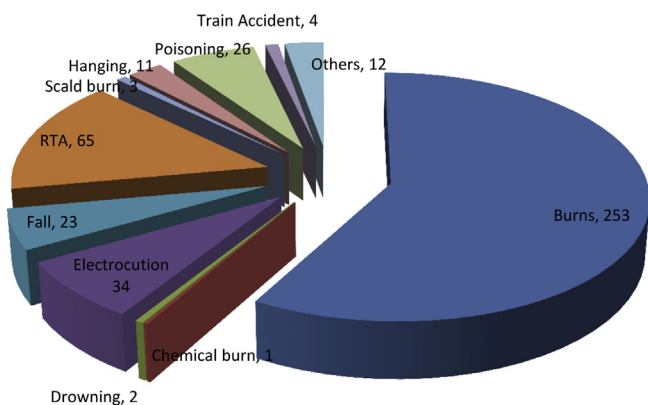


Fig. 1. Causes of unnatural deaths.

in emergency departments, accounting for between 25% and 52%.^{15,16} Drowning was surprisingly very less in our study but it is an important cause of death in some part of globe. Over 60% of the world's drowning occurs in the Western Pacific Region and South-East Asia, China and India have particularly high drowning mortality rates and together contribute 43% of the world's drowning deaths.¹⁷ However there is large regional variation of incidence worldwide.^{17,18} In our review electrocution contributed 7.83% (34) to the total deaths which was not found any of the studies. None of the literature has shown electrocution as a leading cause of death in adolescents.

Most of these deaths are preventable if dealt strategically. Most of the developed countries and many of the developing countries like Sri Lanka have developed evidence based strategies to prevent such deaths.^{9,15,19}

It is the need of the hour to recognize these unnatural deaths as a significant contributor for mortality and to have a preventive need based plan for such unwanted deaths particularly in adolescents.

Ethical approval

None.

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Conflict of interest

This to certify that there is no conflict of interest in this research work. No funding any type is involved. Dr. Mnish collected the postmortem data, Dr Shivani analysed the data in a systematic manner along with Dr. Pradeep and Dr. Pradeep prepared the manuscript.

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